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Materials and Coatings

LaRC RP-50 Polyimides

Heat, moisture, and chemical resistant polyimides

NASA Langley Research Center LaRC RP-50 series of polyimide thermosets are highly heat resistant, as well as, moisture and chemical resistant. RP-50 polyimides are similar to the successful RP-46 series of polyimides, except that rather than being used for structural composites, RP-50 polyimides are best utilized as high temperature coatings, adhesives, thin films, or composite matrix resins. Beyond high temperature resistance, RP-50 polyimides have many other advantages over comparable materials, such as excellent adhesion properties and that they are created with readily available raw materials.

BENEFITS

- Heat, moisture, and chemical resistant
- Created with readily available raw materials
- Can withstand repeated instantaneous temperature surges at temperatures up to 600 degrees Celsius
- Does not swell or degrade when exposed to hydraulic fluids, jet fuels, lubricating oils, strong cleaning solutions or seawater
- Excellent adhesion to a wide variety of metallic, ceramic and other non-metallic substrates

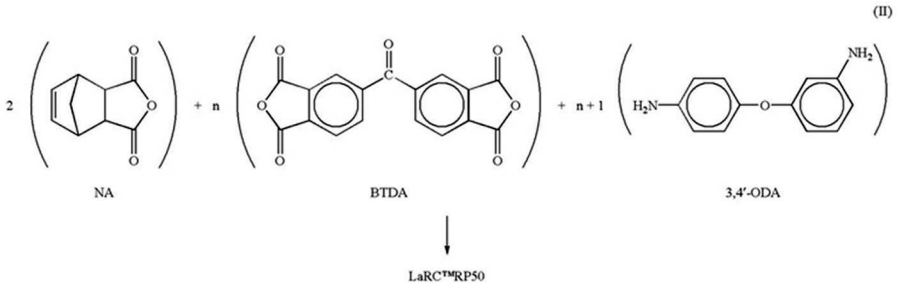
APPLICATIONS

- High temperature coatings
- Adhesives
- Thin films
- Composite matrix resins

technology solution

THE TECHNOLOGY

The polyimides are prepared by reacting a mixture of compounds including (a) 3,3',4,4'-benzophenonetetracarboxylic dianhydride (BTDA), (b) 3,4'-oxydianiline (3,4'-ODA), and (c) 5-norbornene-2,3-dicarboxylic anhydride (NA) in a high boiling, aprotic solvent to give 5 to 35% by weight of polyamic acid solution. The ratio of (a), (b), and (c) is selected to afford a series of polyimides having different molecular weights and properties. Using a two-step condensation method, the mixture first forms a polyamic acid precursor. Upon heating at or above 300 C, the polyamic acids then form polyimides, which are particularly suitable for use as a high temperature coating, adhesive, thin film, or composite matrix resin.



Equation for synthesis of LaRC RP-50

PUBLICATIONS

Patent No: 6,777,525

National Aeronautics and Space Administration

The Technology Gateway

Langley Research Center

Mail Stop 151
Hampton, VA 23681
757-864-1178
LARC-DL-technologygateway@mail.nasa.gov

http://technology.nasa.gov/

www.nasa.gov

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